Sustainable Biopolymers for Fiber (Filament and Non-woven)

Compounds: PHACT™ CA8370P and CA8770P

Target Applications

Markets
- Hygiene / Filtration
- Textiles / Cosmetics
- Fisheries

End Products
- Diapers / Masks / Wet wipes
- Teabags / Coffee filters
- Apparel / Floor Pads / Mask pack
- Brushes / Fishnets

Bring a New Wave PHACT

PLA/PHA COMPOUNDS

PHACT CA8370P and PHACT CA8770P are compounded resins using polylactic acid (PLA) and amorphous PHA (aPHA) known as PHACT A1000P. The grades can be used for a broad range of fiber, textile, and non-woven applications. Both grades are suitable for conventional fiber spinning and drawing processes. Fibers made with PHACT CA8370P or CA8770P have excellent texture and softness compared to PLA alone. PHACT CA8370P is suitable for filament (mono, multi) and PHACT CA8770P is for non-woven (spun bond, staple fiber). Converters can produce fibers at lower temperatures than PLA, enhancing processability and reducing costs. Final products made from PHACT CA8370P and CA8770P have better biodegradability relative to PLA fibers.

PHACT CA8370P & CA8770P Features

- 100% bio content
- Industrial compostable
- Enhanced spinning productivity
- FDA-approved for food contact(1)
- Relative to PLA:
  - Increased flexibility and softness
  - Better dyeability (color expression)

1) US FDA FCN2281, Korea FDA authorized substances (hydroxybutyl polyester (HBP), polylactic acid (PLA))

Sustainable Biopolymers for Fiber (Filament and Non-woven)

Compounds: PHACT™ CA8370P and CA8770P

Mechanical Properties

Compound Grades for Fiber				
Properties	**Units**	**ASTM**	**CA8370P (Filament)**	**CA8770P (Non-woven)**
Forms	-		Pellet	Pellet
Specific Gravity	-	D792	1.23	1.23
Melt Flow Rate (190°C, 2.16 kg)	g/10 min	D1238	8	8
Glass Transition Temperature(1)	℃	D3418	-15	-15
Crystalline Melt Temperature(1)	℃	D3418	171	171

1) Differential Scanning Calorimeter (DSC), the peak of endotherm. Heating rate 10 ℃/min.

Recommended Processing Conditions

Compound Grades for Filament Extrusion			
Dry Temperature(1)	60 ℃ X 12 hrs.	Feed Throat	20 ~ 40 ℃
Feed Temperature	min. 170 ℃	Compression Section	min. 190 ℃
Melt Temperature	min. 180 ℃	Nozzle	min. 200 ℃

Compound Grades for Non-woven Extrusion			
Dry Temperature(1)	60 ℃ X 12 hrs.	Feed Throat	20 ~ 40 ℃
Feed Temperature	min. 160 ℃	Compression Section	min. 180 ℃
Melt Temperature	min. 170 ℃	Nozzle	min. 190 ℃

1) It is preferable to dry with air below -40 ℃ dew point.

Sustainable Biopolymers for Fiber (Filament and Non-woven)

Compounds: PHACT™ CA8370P and CA8770P

Drying Process Conditions

- Biodegradable materials are highly hygroscopic. Store in a dry condition.
- Recommended to use all once opened. If an opened bag must be stored for reuse, seal completely, avoid air exposal, and store at a dry, well-ventilated condition/place/location. Avoid long-term storing.
- PHACT Compounds must be dried under 60 ℃ for over 5 hrs. or caking can happen because the Tg of this compound is around 60 ℃.
- PHACT Compounds are preferable to dry with air below -40 ℃ dew point.
- When exposed to moisture, completely dry in a dehumidifying dryer before use.

Purging Process Conditions (*Following PET, PA, HDPE)

It is critical to clean the material handling systems of PET, nylon, and high molecular weight HDPE to assure that these materials do not inadvertently feed into the extruder during or after the purging process.

1) Purge with low MFR (e.g., <1) transition resin at normal PET operating temperatures. PET and PHACT are temperature incompatible, so the transition resin is one that can be processed at the high temperatures of PET and the low temperatures of PHACT.
   Suggested transition resins include PP, crystal PS, and PETG. Purge for at least 7x average residence time, much of the time at the typical PET production rate (~30 minutes).
2) Let the system empty as much as possible. Clean out the hopper as much as possible.
3) Introduce higher melt flow transition resin (PP, PS, PETG) and change to normal PHACT operating temperatures.
4) Let the system empty as much as possible. Then transition to pure PLA resin or PHACT and purge, again, for a minimum 7x average residence time. Change the screen pack when it becomes obvious that primarily PLA (or PHACT) is exiting the die.
5) At the completion of a trial run, purge all PHACT from the extrusion system, using low melt index PP or PS.

*Notes: It is critical that all drying and conveying/receiving systems be free of all PET and vacuumed to ensure there is no remaining polymer dust before adding PHACT. PET will not melt at PHACT operating temperatures and will block screens if it is present in the system.

CJ Biomaterials Inc., 19 Presidential Way – Suite 301, Woburn MA 01801

For additional information or specific recommendations for your intended applications, please contact us at:

cj.biomaterials@cj.net or 339-999-2693